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C. P. CRUTCHFIELD.

BICYCLE GEAR SUPPORTING MECHANISM.

(Application filed June 18, 1898.)

(No Model.)

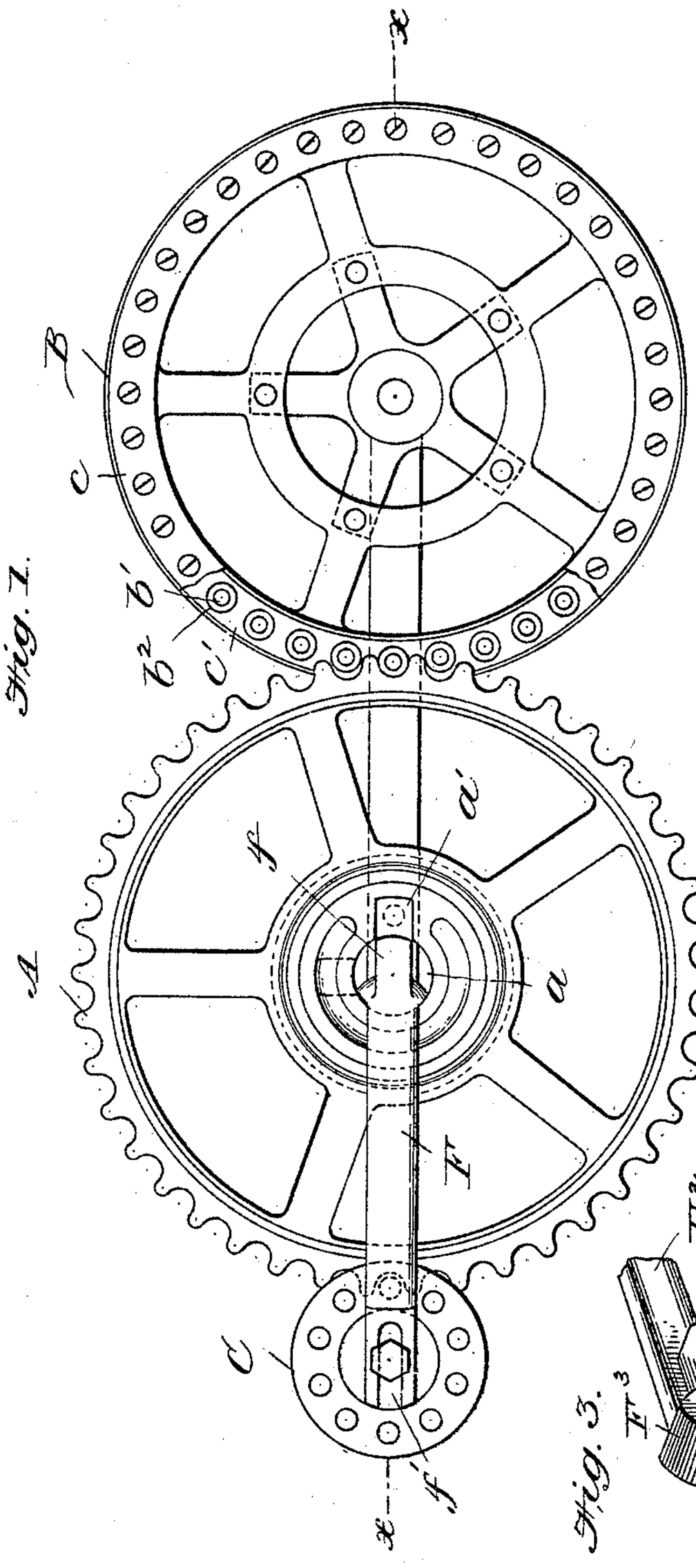

Fig. 1.

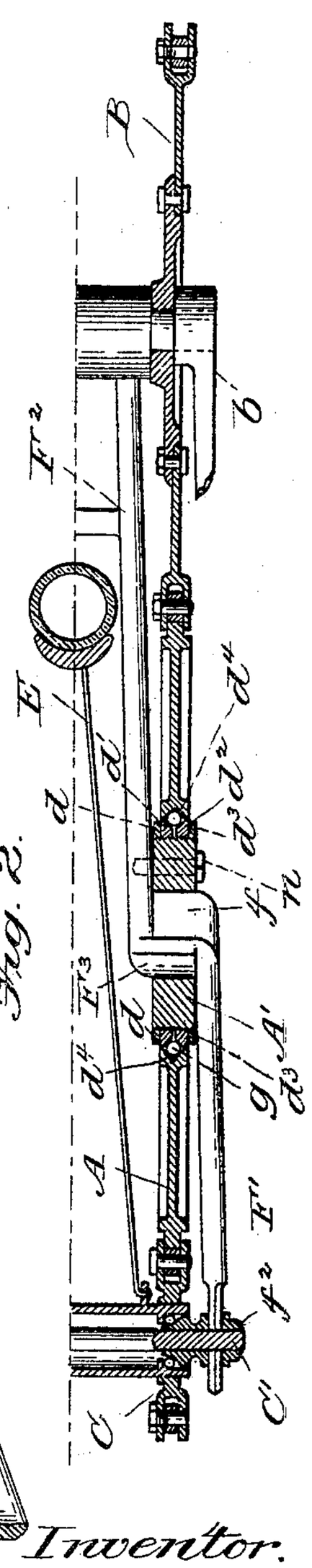

Fig. 2.

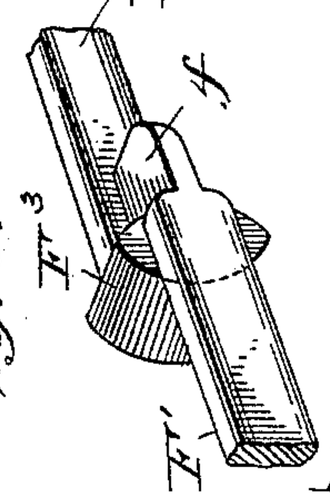

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES P. CRUTCHFIELD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES I. PITMAN, OF SAME PLACE.

BICYCLE-GEAR-SUPPORTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 622,758, dated April 11, 1899.

Application filed June 18, 1898. Serial No. 683,780. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. CRUTCHFIELD, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Bicycle-Gear-Supporting Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention has special relation to bicycles employing a train of gearing for the driving mechanism; and it consists in the construction hereinafter particularly described and claimed of mechanism for supporting and adjusting the intermediate gear in the train of gearing.

My invention has for its main object to provide a ready and most efficient means of journaling the gearing in bicycles of the construction referred to and of assembling and disassembling the same.

A further object of my invention is to provide an efficient and easily-adjusted locking construction for the bearing of the central gearing, so that the same may be held when in position in perfect adjustment with the other gear-wheels without liability to displacement.

In the accompanying drawings, Figure 1 is a side elevation of a train of gearing of two gear-wheels and a pinion adjusted and in mesh with each other, adapted to a bicycle, embodying my improved construction. Fig. 2 is a sectional view of the same on the line *x x*, Fig. 1, but in a locked position, representing in addition the relative position of the rear wheel of the bicycle. Fig. 3 is a perspective view of a portion of the gear-supporting rod, showing the locking-tongue and bearing-support in detail.

A represents the center gear-wheel, B the gear provided on the crank-shaft, and C the gear or pinion attached to the hub of the rear driving-wheel. A section of the crank *b* is illustrated in Fig. 2, which drives the gear B, which in turn communicates the power to the rear driving-wheel E through the medium of the intervening gear A and pinion C. In the drawings I have illustrated the gear B and the pinion C as having antifrictional roller-teeth comprising the transversely-disposed pins *b'*, set in a groove formed by the circular plates *c c'*, bolted together on opposite sides of the groove, the bolts *b'* having provided thereon the rotatable antifriction-sleeve b^2. This construction, however, is merely a preferable construction of gear-wheel and pinion, into which the toothed gear-wheel A is adapted to mesh, though other constructions of gear-wheel may be readily employed.

The bearing of the center gear-wheel A is composed of a disk A', preferably equal to about one-third the diameter of the gear-wheel and of a thickness slightly greater than the thickness of the gear-wheel. The disk A' has a central bore *a* of a diameter slightly greater than the thickness of the rod F, which is adapted to pass therethrough, as hereinafter described. A slot *a'* is also provided in the said disk A', opening into and to one side of the orifice *a*, adapted for the reception of the tongue *f*, rigidly provided upon the bar F to receive the said tongue in the assembling of the device. I preferably provide a screw-thread upon the circumference of the disk A' and form the ball-bearing groove on the disk A' as a journal-bearing for the gear-wheel A. The ball-bearing groove proper I preferably construct of the two disks *d' d²*, each being cut or formed with partially-grooved or angular faces, which when in position opposite each other, as illustrated in Fig. 2, form the inner groove or ball-race for the balls *g*, the said disks *d' d²* being internally screw-threaded and adapted to the screw-threads provided upon the disk A', and in this manner by the adjustment of the respective disks *d' d²* upon the disk A' the size and depth of this groove or ball-race may be regulated to a nicety. Upon the outside of the sectional disks *d'* and *d²* I also provide locking-disks *d* and *d³*, similar in construction. The other member *d⁴* of the groove or raceway is formed in the inner circumference of the gear-wheel A for the reception of the balls *g*.

The horizontally-disposed rod F is supported at its forward end to the crank-hanger bracket and at its rear end upon the rear-wheel axle or tie-rod C', being preferably ad-

justed upon the end of the said axle or rod C′ in a slot *f′*, so that the parts may be easily adjusted. The rod F is preferably integral and bent or formed to constitute substantially parallel members F′ F² and the member F³ transversely disposed at a point about midway of the rod or at the point of bearing of the gear-wheel A, the member F² by reason of the construction of gearing being usually necessarily slightly longer than the member F′. The inner faces of the members F′ and F² at the point of bearing of the disk A′ are separated from each other at a distance equal to the thickness of the disk A′, so that the rear portion of the outer face of the disk A′ will bear against the inner face of the member F′ and the inner face of the forward portion of the disk A′ will bear against the inner face of the member F². The tongue *f* is preferably slightly narrower in width than the main body of the bar, as illustrated in the drawings, and is extended forward as a continuation of the member F′ a slight distance, the distance between the rear face of the member F³, which is convexed, and the forward face of the tongue *f* being equal to the diameter of the orifice *a* in the disk A′, the two said faces when the disk A′ is turned to its locked position, as illustrated in Fig. 2, forming solid shoulders or walls, upon which the walls of the orifice *a* neatly fit and rest. When in the locked position illustrated in Fig. 2, the set-screw *n* is provided through the disk A′ into the arm F² in order to more securely hold the disk in position. It will thus be seen that the disk A′ is rigidly secured upon the horizontal bar and forms a positive substantial bearing for the gear-wheel A.

From the foregoing description the operation and adjustment will be readily understood.

In assembling, the gear-wheel A is first properly adjusted on its ball-bearings on the disk A′, as hereinbefore described. The gear-wheel B and the pinion C being in position, the member F′ of the rod F—its rear end being freed from the axle C′, which is slightly drawn back—is inserted through the orifice *a* in the disk A′, and the said disk advanced on the member F′ until the slot *a′* registers with the tongue *f*, when the disk A′ and the gear A, being forced back to the parallel line indicated in Fig. 2, are then slightly advanced to properly mesh with the gear B to the position illustrated in Figs. 1 and 2. The disk A′ is then rotated until the slot *a′* assumes the position illustrated in the dotted lines in Fig. 1. The screw *n* is then adjusted and the disk rigidly locked upon the supporting-bar. The pinion C on the hub of the wheel E is then moved forward until it meshes properly in the gear A, and the axle or tie rod C′ is securely locked through the medium of the nut *f²* in the slot *f′* of the member F′. In a similar manner the gearing may be readily taken apart for cleaning, repair, or otherwise with but little loss of time.

It is clear from the description of my improved construction that a most rigid and substantial gearing-support for bicycles employing this class of gearing is most effectually provided and that the gearing may be assembled or disassembled most readily by any bicycle-rider with little or no knowledge of mechanical constructions.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a train of gears, a removable gear mounting or bearing comprising a center disk having a centrally-disposed orifice provided therethrough and an eccentrically-located slot therein communicating with said orifice, a horizontally-disposed rod or support for said disk having a transversely-disposed axle or bearing adapted to said central orifice of said disk, a portion of said axle, or bearing, being reduced to form a tongue adapted to said eccentrically-located slot in said disk on assembling or disassembling, substantially as described.

2. In a train of gears a removable gear mounting or bearing comprising a centrally-located disk, A′, having transversely-disposed orifice, *a*, and slot, *a′*, a supporting-bar, F, comprising members, F′, F², F³, and tongue, *f*, provided upon said member, F³, said member, F³, and tongue, *f*, being of a combined width, or diameter longitudinally considered, substantially equal to the interior diameter of the orifice, *a*, and adapted to impinge upon the walls thereof when in a locked position, said tongue, *f*, being adapted to the slot, *a′*, in the disk, A′, in assembling or disassembling, substantially as described.

3. In a train of gears, for bicycles, &c. a removable gear mounting, or bearing, A′, having a ball-bearing groove or raceway provided upon the circumference thereof, gear-wheel, A, mounted thereon having a coincident groove in its inner periphery at the point of bearing and balls provided in said grooves, a transversely-disposed orifice, *a*, centrally provided in said disk, A′, and slot, *a′*, opening therein, a supporting-bar, F, comprising members, F′, F², F³, and tongue, *f*, provided upon said member, F³, said member, F³, and tongue, *f*, forming the axis of the disk, A′, of a diameter in one direction substantially equal to the diameter of the orifice, *a*, and adapted when locked to impinge thereon, said tongue, *f*, being adapted to the slot, *a′*, in assembling or disassembling the parts, substantially as described.

4. In a train of gearing for bicycles, &c., a gear-support comprising a bar, F, having members, F′, F², substantially parallel with each other, and transversely-disposed axis, F³, reduced in breadth forming a tongue, *f*, a disk, A′, carrying a gear-wheel, A, in ball-bearings on the circumference of the said disk in a groove or raceway, said disk, A′, having transversely-disposed orifice, *a*, elongated slot, *a′*, opening therein, said orifice, *a*, adapt-

ed for the passage of the axis, F^3, and slot adapted to the tongue, *f*, in assembling or disassembling, substantially as described.

5. In a bicycle-gearing, a gear-wheel, A, central removable disk, A′, screw-threaded disks, *d*′, d^2, provided in screw-threads upon said disk, A′, forming a groove or raceway, balls, *g*, groove, d^4, provided in said gear-wheel, A, for the balls, *g*, locking nuts or disks, *d*, d^3, orifice, *a*, provided in said disk, A′, slot, *a*′, opening therein, supporting-bar, F, having members, F′, F^2, substantially parallel with each other and transversely-disposed axis, F^3, reduced in breadth forming a tongue, *f*, said axis adapted to the orifice, *a*, and tongue, *f*, to the slot, *a*′, in assembling or disassembling, and set-screw, *n*, for rigidly securing the disk, A′, in position when locked, substantially as described.

In witness whereof I have hereunto set my hand this 13th day of June, A. D. 1898.

CHARLES P. CRUTCHFIELD.

Witnesses:
BENJ. F. PERKINS,
HORACE PETTIT.